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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/720,035

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Francis Yu-Hei Tsang

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EXAMINER

LE, HUNG CHARLIE

ART UNIT

PAPER NUMBER

3663

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/720,035	Applicant(s) TSANG ET AL.	
	Examiner Hung C. Le	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23 - 25, 27 - 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23 - 25, 27 - 29 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>various</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/14/2006 has been entered.

Response to Arguments

2. a) Applicant's arguments with respect to claims 23 –25, 27 – 29 (Claims 1 – 22, 26, 30 - 78 were withdrawn by applicant) have been considered but are moot in view of the new ground(s) of rejection.
- b) Objections of drawings and specification on OA dated 07/14/2006 are withdrawn.

Claim Objections

3. Claim 23 is objected to because of the following informalities:

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Line 5: "...said first and second metal contact layer;..."

Should be: "...said first and second metal contact layers;..."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 23 & 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 23:

The term "...said first side of said second metal contact layer is positioned facing said first side of said first metal contact layer..." is vague/unclear as do not know which side of the layers are considered first side.

With respect to claim 27:

The term "...said first side of said first metal contact layer and said first side of said second metal contact layer..." is vague/unclear as do not know which side of the layers are considered first side.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 23 – 25, 27 – 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown (6,118,204) in view of any of Snyder et al. (6,700,298) and Kherani et al. (5,606,213). Brown discloses applicant's claim limitation except for liquid semiconductor contains a solution of radioisotopes and spacers which are taught

by Snyder et al. (Fig. 1) and Schottky contact which is taught by Kherani et al. (Col. 6, lines 57+).

With respect to claim 23:

Brown discloses: A nuclear voltaic cell comprising:

a first metal contact layer (5) having a first side (Fig. 1);

a second metal contact layer (6) having a first side, wherein said first side of said second metal contact layer is positioned facing said first side of said first metal contact layer and forms a channel (2, 3 & 4) between said first (5) and second (6) metal contact layer;

an electrical circuit (7) connecting said first metal contact layer (5) to said second metal contact layer (6).

wherein it is understood that Ohmic contacts are clearly disclosed in column 5 lines 10-12 of Brown.

Brown does not appear to specifically disclose the use of a Schottky contact or a liquid semiconductor, however Brown does disclose the potential difference (i.e. the voltage) between the two electrodes is equal to the difference in their work functions, i.e. their Fermi potential difference (column 6 lines 62-65).

While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ

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25 (1972).

Kherani et al. (Column 6 lines 57+) is similar with Brown (column 6 lines 62- 65) in that both Brown and Kherani et al. teach that the nuclear cell potential is essentially varied by the work function or Fermi level of the selected semiconductors and Kherani furthers this by teaching that the cell potential and power characteristics can be further extended by the use of metal semiconductor junctions, also known as Schottky barrier junctions (contacts).

If applicant is of the opinion that Brown does not inherently contain at least one metallic contact layer that forms a Schottky contact, then at the time of the invention it would have been obvious to one of ordinary skill in the art to have one of the metallic contact layers form a Schottky contact for at least the benefits of extending the nuclear cells potential (output voltage) and power characteristics as taught to be old and advantageous by Kherani et al.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the nuclear voltaic cell as disclosed by Brown with the teachings of Snyder et al. and Kherani to use liquid semiconductor instead of solid semiconductor for the benefits of increased density (i.e. increased efficiency), diffusibility and conductivity, etc., as such a modification is no more than the work of an expedient within the art.

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With respect to claim 24:

It is clearly disclosed in Brown column 6 lines 46+, wherein electrical power is generated when an electrical load is applied to said electrical circuit.

With respect to claim 25:

It is disclosed in Brown, wherein the type of the semiconductor is determined by at least the selection of the metal of the electrode contacting said semiconductor. Even applicants own specification page 13 lines 12-17 teaches that those familiar with the art are well aware that the selection of the materials of construction of the electrodes is dependant on the properties/effects desired.

Wit respect to claim 27:

It is considered that the Krypton dispersed in the semiconductor material reads on the plurality of nonconductive spacers because Krypton is nonconductive and takes up space (i.e. a spacer) and is between the first and second metal contact layers and the current claim language does not require anything further.

Wit respect to claim 28:

Brown as modified above now includes liquid semiconductor material. It is inherent that any liquid will "flow" to fill its container. It is also considered to be inherent that there is at least some amount of flow, no matter how small, is occurring in any liquid at any time and therefore Brown reads on the claim language.

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown (6,118,204) in view of any of Snyder et al. (6,700,298) and Kherani et al. (5,606,213) and further in view of Knight (3,344,289).

Brown (6,118,204) in view of any of Snyder et al. (6,700,298) and Kherani et al. (5,606,213) discloses as above.

Knight teaches it is notoriously old and well known in the nuclear voltaic cell art (nuclear batteries) to coil or roll up the materials of nuclear batteries for the benefits of doubling the efficiency of said batteries because of the geometry of the materials that accompanies rolling, i.e. the radioactive material is surrounded by more material capable of producing electron hole pairs, in column 2 lines 65+ and column 3 lines 1-8.

At the time of the invention it would have been obvious to one of ordinary skill in the art to wrap the invention of Brown around a mandrel for the benefits of decreasing the overall size of the battery for the same output and for doubling the efficiency as taught to be old and advantageous by Knight.

10. The statements of intended use or field of use, e.g., "having..., forms..., connecting..., is generated, wherein..., flows..., to form..., are wound, etc..." clauses are essentially method limitations or statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re

Pearson, 181 USPQ 641; In re Yansih, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP § 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2nd 1647

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP § 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung C. Le whose telephone number is 571-272-8757. The examiner can normally be reached on M-F: 07:30am - 05:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HCL
03/30/07


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